

What is claimed is:

1. A method of sampling liquids comprising the steps of:  
drawing liquid from a heated fluid;  
cooling the liquid to a temperature lower than 84 degrees Fahrenheit;  
causing the liquid to flow through a needle into a container after it is cooled until the container overflows;  
removing the needle; and  
closing the container automatically as the needle is withdrawn.
2. The method of claim 1 in which the liquid is cooled within a housing having a cooled interior for a sufficient amount of time to reduce its temperature to less than 84 degrees Fahrenheit prior to moving the liquid into the container.
3. The method of claim 2 in which the liquid is moved through a long ballast tube within the housing, said ballast tube being sufficiently long to maintain the liquid in the housing until it is at a temperature lower than 84 degrees Fahrenheit.
4. A method according to claim 1 further including the step of causing the liquid to flow continuously as the needle is withdrawn through a valve opening.
5. The method of claim 1 in which a valve is open to atmosphere for less than ten minutes.

6. The method of claim 1 in which the step of causing the liquid to flow includes the substeps of automatically opening a valve with a narrow clearance between the needle and valve opening just before the needle enters the container to permit the needle to pass through it; causing the liquid to flow outwardly from the needle; causing the liquid to continue to flow as the needle is removed; and automatically closing the valve as soon as the needle clears the valve opening, whereby the liquid retains its volatile material during sampling.

7. A method in accordance with claim 1 in which the liquid is caused to flow from the needle laterally outwardly as the needle is withdrawn.

8. A method in accordance with claim 6 wherein the steps of automatically opening and closing the valve include the substep of rotating a rotatable member.

9. A method in accordance with claim 1 further including the step of sequentially bringing a plurality of containers into juxtaposition with at least one filling station for filling the container.

10. A method in accordance with claim 6 in which the substeps of opening the valve and closing the valve are synchronized with the steps of inserting a needle and withdrawing a needle so as to reduce the communication of the interior of the container with the atmosphere.

11. An apparatus for sampling liquids, comprising:  
means for cooling a liquid to below 40 degrees Fahrenheit;  
means for causing the liquid to flow through a needle into a container until the container overflows;  
means for removing the needle; and  
means for closing the container automatically as the needle is withdrawn.

12. The apparatus of claim 11 in which the means for cooling includes a housing having a cooled interior.

13. The apparatus of claim 12 in which the means for cooling further includes a long ballast tube within the housing, said ballast tube being sufficiently long to reduce the temperature of the liquid in the housing to a temperature lower than 84 degrees Fahrenheit.

14. An apparatus according to claim 11 further including means for causing the liquid to flow continuously as the needle is withdrawn.

15. The apparatus of claim 14 in which the means for causing the liquid to flow through the needle into a container includes:  
means for causing the liquid to flow through the needle to the bottom of the container;

a valve with a narrow clearance between the needle and valve opening;  
means for automatically opening the valve as the needle enters the container;  
means for causing the liquid to flow outwardly from the needle and to overflow through the valve opening;  
means for pumping the liquid as the needle is removed, whereby the liquid continues to flow; and  
means for closing the valve as soon as the needle clears the valve opening, whereby the liquid retains its volatile material during sampling.

16. Apparatus in accordance with claim 15 further including means for causing the liquid to flow from the needle laterally outwardly as the needle is withdrawn.

17. Apparatus in accordance with claim 15 in which the valve includes a valve opening in a rotatable member, wherein the container is closed and opened automatically by rotating the rotatable member as the needle moves downwardly toward the container or upwardly away from the container.

18. A method of sampling liquid comprising the steps of:  
cooling the liquid;  
causing the liquid to flow through a needle into a container until the container overflows;  
removing the needle; and  
closing the container automatically as the needle is withdrawn.

19. The method of claim 18 in which the liquid is cooled within a housing having a cooled interior for a sufficient amount of time to reduce its temperature to less than 84 degrees Fahrenheit prior to moving the liquid into the container.

20. The method of claim 19 in which the liquid is moved through a long ballast tube within the housing, said ballast tube being sufficiently long to maintain the liquid in the housing until it is at a temperature lower than 84 degrees Fahrenheit.

21. A method according to claim 18 further including the step of causing the liquid to flow continuously as the needle is withdrawn through an opening.

22. The method of claim 18 in which a valve is open to atmosphere for less than ten minutes.

23. The method of claim 18 in which the step of causing the liquid to flow includes the substeps of automatically opening a valve with a narrow clearance between the needle and valve opening just before the needle enters the container to permit the needle to pass through it; causing liquid to flow outwardly from the needle; causing the liquid to continue to flow as the needle is removed; and closing the valve as soon as the needle clears the valve opening, whereby the liquid retains its volatile material during sampling.

24. A method in accordance with claim 18 in which the liquid is caused to flow from the needle laterally outwardly as the needle is withdrawn.

25. A method in accordance with claim 23 wherein the steps of opening and closing the valve include the substep of rotating a rotatable member.

26. A method in accordance with claim 25 further including the step of sequentially bringing a plurality of containers into juxtaposition with at least one filling station for filling the container.

27. A method in accordance with claim 23 in which the substeps of opening the valve and closing the valve are synchronized with the steps of inserting a needle and withdrawing a needle so as to reduce the communication of the interior of the container with the atmosphere.

28. An apparatus for sampling liquids, comprising:

- means for drawing liquid;
- means for cooling the liquid;
- means for causing the liquid to flow through a needle into a container until the container overflows;
- means for removing the needle; and
- means for closing the container automatically as the needle is withdrawn.

29. The apparatus of claim 28 in which the means for cooling includes a housing having a cooled interior.

30. The apparatus of claim 29 in which the means for cooling further includes a long ballast tube within the housing, said ballast tube being sufficiently long to reduce the temperature of the liquid in the housing to a temperature lower than 84 degrees Fahrenheit.

31. An apparatus according to claim 28 further including means for causing the liquid to flow continuously as the needle is withdrawn.

32. The apparatus of claim 28 in which the means for causing the liquid to flow through the needle into a container includes:

means for causing the liquid to flow through the needle to the bottom of the container;

a valve with a narrow clearance between the needle and valve opening;

means for automatically opening the valve as the needle enters the container;

means for causing the liquid to flow outwardly from the needle and to overflow through the valve opening;

means for pumping the liquid as the needle is removed, whereby liquid continues to flow; and

means for closing the valve as soon as the needle clears the valve opening, whereby the liquid retains its volatile material during sampling.

33. Apparatus in accordance with claim 28 further including means for causing the liquid to flow from the needle laterally outwardly as the needle is withdrawn.

34. Apparatus in accordance with claim 28 in which a valve includes a valve opening in a rotatable member, wherein the container is closed and opened automatically by rotating the rotatable member as the needle moves downwardly toward the container or upwardly away from the container.

35. Apparatus in accordance with claim 28 further including means for sequentially bringing a plurality of containers and stations into juxtaposition with each other for filling of the containers.

36. A method of sampling liquid comprising the steps of:  
cooling the liquid:  
inserting a hollow needle into a container having a cap with a valve member and an opening in the valve member sized to narrowly receive the hollow needle;  
causing the liquids to flow through the needle until the container overflows;  
removing the needle; and  
closing the container automatically as the needle is withdrawn.

37. The method of claim 36 in which the liquid is cooled within a housing having a cooled interior for a sufficient amount of time to reduce its temperature to less than 84 degrees Fahrenheit prior to moving the liquid into the container.



38. The method of claim 36 in which the liquid is moved through a long ballast tube within the housing, said ballast tube being sufficiently long to maintain the liquid in the housing until it is at a temperature lower than 84 degrees Fahrenheit.

39. A method according to claim 36 in which the hollow needle is extended through the opening in the valve member while the valve member opening is perpendicular to a longitudinal axis of the valve member and adapted to fit a container opening and turning the valve member to another position to close the container opening.

40. A method in accordance with claim 40 further including the step of automatically opening and closing the valve member.

41. The method of claim 40 in which the step of automatically opening and closing the valve member comprises the step of engaging a cam follower connected to the valve member with a cam.

42. An apparatus for sampling liquids, comprising:  
means for cooling a liquid to below 40 degrees Fahrenheit;  
means for causing the liquid to flow through a hollow needle into a container until the container overflows to a level on the top of at least a portion of a container cap;  
means for removing the needle; and  
means for closing the container automatically as the needle is withdrawn;

said container cap including an upper portion; said upper portion having a valve member and an opening in the valve member sized to narrowly receive the hollow needle in the valve member.

43. The apparatus of claim 42 in which the means for cooling includes a housing having a cooled interior.

44. The apparatus of claim 43 in which the means for cooling further includes a long ballast tube within the housing, said ballast tube being sufficiently long to reduce the temperature of the liquid in the housing to a temperature lower than 84 degrees Fahrenheit.

45. Apparatus according to claim 42 in which the valve member extends through the opening in the valve member while the valve member opening is perpendicular to a longitudinal axis of the valve member and is adapted to be aligned in one position with a container opening and in another position to close the container opening.

46. Apparatus in accordance with claim 42 in which the valve member includes a cam follower on one end adapted to engage with a cam for opening and closing the valve opening.

47. Apparatus in accordance with claim 42 further including a closure portion adapted to engage an opening of the container.

48. Apparatus according to claim 46 in which the valve member includes a valve member handle and the length of the valve member handle is no smaller than 0.240 inch nor greater than 0.750 inch.

49. Apparatus according to claim 48 in which the length of the valve member handle is no smaller than 0.125 nor greater than 1.6 inches.

50. Apparatus according to claim 49 in which the outer diameter of the valve member handle is no smaller than 0.700 inch nor greater than 0.950 inch.

51. Apparatus according to claim 45 in which a valve passageway has a diameter no narrower than 0.150 nor greater 0.500 inch.